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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 09/630,918
Filing Date: August 02, 2000
Appellant(s): KRAAL ET AL..

Daniel H. Bliss
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 9/8/06 appealing from the Office action mailed 1/4/05.

(1) Real Party of Interest

A statement identifying by name the real party of interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings, which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

- Nayar, titled "DENEB/ERGO- A Simulation-based Human Factors Tool" (1995)

- Purschke, titled, "Virtual Reality-New Methods for Improving and Accelerating the Development Process in Vehicle Styling and Designing" (1998).

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1-6, 8-20 are rejected under 35 U.S.C. 103 (a) as unpatentable by Nayar ("DENEB/ERGO—A Simulation-based Human Factors Tool" (1995)), in view of Purschke (" Virtual Reality-New Methods for Improving and Accelerating the Development Process in Vehicle Styling and Designing" (1998)).

Nayar teaches an interactive 3D software simulation-based tool for human factors and ergonomic analysis which focuses on various motions, posture (abstract), scaling down (pg. 428, section 1.4, lines 7-8) to accommodate any specific purpose; but doesn't teach using this feature for automotive interior design.

Purschke et al., teaches a series of steps of car development using virtual humans for interior design. Both pieces of art are analogous since they teach ergonomic virtual reality.

Therefore, at the time the invention, it would have been obvious to one of ordinary skill in the art to use Purschke to modify Nayar since Purschke teaches a method that would have been advantageous to have a scalable virtual human to adjust specific car interior features towards a specific market demographic.

Claim 1. A system for subjective evaluation of a vehicle design (Purschke: title) within a virtual environment using virtual reality comprising (Purschke: title): a scaleable (Nayar pg. 428, section 1.4, lines 7-8) physical property representative of the vehicle design, wherein the physical property is adjusted according to a scale ratio (Nayar pg. 428, section 1.4, lines 7-8) for an evaluator of the vehicle design wherein the scale ratio (Nayar pg. 428, section 1.4, lines 7-8) is a ratio between a predetermined dimension of the evaluator and a predetermined dimension of a member of a target population (Nayar: pg 482, sections 1.4; and 3; specifically, section 3, right column, 2nd paragraph, last sentence); a computer system for digitally creating a virtual environment having a virtual human immersed (Nayar: pg.428, left column, 3rd paragraph) within the virtual environment (Purschke: abstract), wherein the virtual environment includes the vehicle design and the virtual human virtually represents a scaled evaluator (Nayar: pg. 428, section 1.4, lines 7-8; and Purschke: pg. 9 figure 12, and section 3.1); a motion capture system for sensing a motion (Purschke: pg. 11, lines 26) of the evaluator and communicating the sensed motion of the evaluator to the computer system, so that the motion of the evaluator controls the motion (Nayar: pg.428, left column, 3rd paragraph) of the virtual human in the virtual environment; and a virtual reality display (Purschke: pg. 9, figure 12) mechanism operatively communicating with the computer system, for providing the evaluator a view of the virtual environment while evaluating the vehicle design (Purschke: pg.1, Introduction, 3rd paragraph with pg. 9, figure 12; Nayar: figures 1 and 3).

Claim 2. The system of claim 1(Purschke: title; Nayar: pg. 428, section 1.4, lines 7-8; and Purschke: pg. 9 figure 12, and section 3.1) includes an instrumented glove worn by the evaluator for sensing motion of the evaluator's hand (Nayar: pg. 428, section 1.5; and Purschke: pg. 11, line 25).

Claim 3.The system of claim 1(Purschke: title; Nayar pg. 428, section 1.4, lines 7-8; and Purschke: pg. 9 figure 12, and section 3.1) wherein the motion capture system includes magnetic spatial tracking sensors located on the evaluator for sensing motion of the evaluator's full body (Purschke: pg. 11, lines 26).

Claim 4. The system of claim 1(Purschke: title; Nayar: pg. 428, section 1.4, lines 7-8; and Purschke: pg. 9 figure 12, and section 3.1) wherein the virtual reality display mechanism includes a head mounted display mechanism worm by the evaluator for seeing the virtual environment through an eye of the virtual human (Purschke: pg. 11, lines 26).

Claim 5. The system of claim 1(Purschke: title; Nayar: pg. 428, section 1.4, lines 7-8; and Purschke: pg. 9 figure 12, and section 3.1) wherein the computer system includes at least one video terminal displaying a view of the virtual environment as seen through an eye of the virtual human (Nayar: pg. 428, left column, 3rd paragraph).

Claim 6. The system of claim 1(Purschke: title; Nayar: pg. 428, section 1.4, lines 7-8; and Purschke: pg. 9 figure 12, and section 3.1) wherein the computer system includes

at least one video terminal displaying a third person view of the virtual human immersed within the virtual environment (Nayar: pg. 428, section 1.5 with figure 1 pg. 429).

Claim 8. A method of subjective evaluation of a vehicle design (Purschke: title) within a virtual environment using virtual reality, said method comprising (Purschke: title) the steps of: preparing an evaluator of a vehicle design for immersion as a virtual human (Purschke: abstract) in the virtual environment (Purschke: pg. 4, section 1.3), wherein the virtual environment (Purschke: pg. 4, section 1.3) is created within a computer system and includes the vehicle design; determining a scale ratio (Nayar: pg. 428, section 1.4, lines 7-8) and range of a target population (general public) for the evaluator, wherein the scale ratio (Nayar: pg. 428, section 1.4, lines 7-8) is a ratio between a predetermined dimension (car interior, Purschke: abstract) of the evaluator and a predetermined dimension of a member of a the target population (Purschke: title; Nayar: pg. 428, section 1.4, lines 7-8; and Purschke: pg. 9 figure 12, and section 3.1); preparing an adjustable property using the vehicle design (Purschke: title) and the scale ratio (Nayar: pg. 428, section 1.4, lines 7-8); vowing the virtual human (Purschke: pg. 9, figure 12) within the virtual environment to virtual represent a scaled evaluator (Nayar: pg.428, section 3) aligning the virtual human (Purschke: abstract) in the virtual environment with the evaluator (Nayar: pg.428, section 3) and the property, performing the evaluation of the vehicle desire by the evaluator (user design choice); and using the evaluation of the vehicle design (Purschke: title) in the design of the vehicle (Purschke: pg 9-10, section 3) .

Claim 9. Method as set forth in claim 8 (Purschke: title; Nayar: pg. 428, section 1.4, lines 7-8; and Purschke: pg. 9 figure 12, and section 3.1) wherein said step of preparing an evaluator includes the step of measuring an anthropometric dimension of the evaluator (Purschke: pg. 9, section 3.1 and Nayar: pg. 427, left column, section 1.1, line 10).

Claim 10. A method as set forth in claim 8(Purschke: title; Nayar: pg. 428, section 1.4, lines 7-8; and Purschke: pg. 9 figure 12, and section 3.1) wherein said step of preparing an evaluator includes the step of positioning a motion capture system on the evaluator for sensing a motion of the evaluator (Purschke: pg. 9, section 3.1) and communicating the sensed motion (Nayar pg. 428, section 2) of the evaluator to the computer system, so that the motion of the evaluator controls the motion (Nayar pg. 428, section 2) of the virtual human (Nayar: pg.428, section 3) in the virtual environment.

Claim 11. A method as set forth in claim 8 (Purschke: title; Nayar: pg. 428, section 1.4, lines 7-8; and Purschke: pg. 9 figure 12, and section 3.1) wherein said step of preparing an evaluator includes providing the evaluator (Purschke: pg. 9, section 3.1) with a virtual reality display (Nayar: figures 1 and 3) mechanism operatively communicating with the computer system (e.g., via computer cable), for providing the evaluator a view of the

virtual environment (Purschke: abstract) while evaluating the vehicle design (Purschke: abstract).

Claim 12. A method as set forth in claim 8 (Purschke: title; Nayar: pg. 428, section 1.4, lines 7-8 with section 3; and Purschke: pg. 9 figure 12, and section 3.1) preparing an adjustable property includes the step of determining a scale ratio range for a member of a target population (Nayar: pg 482, sections 1.4; and 3; specifically, right column, 2nd paragraph, last sentence) represented in the evaluation and using the scale ratio range (Nayar pg. 428, section 1.4, lines 7-8) to determine adjustability of the property.

Claim13. A method as set forth in claim 8(Purschke: title; Nayar: pg. 428, section 1.4, lines 7-8 with section 3; and Purschke: pg. 9 figure 12, and section 3.1) including the step of determining whether to perform a new evaluation and performing a new evaluation if determined to perform a new evaluation (user preference).

Claim 14. A method as set forth in claim 8 (Purschke: title; Nayar: pg. 428, section 1.4, lines 7-8 with section 3; and Purschke: pg. 9 figure 12, and section 3.1) wherein said step of growing the virtual human (Purschke: abstract) includes the steps of: assuming an initial posture by the evaluator; digitally establishing locations of motion capture (Nayar: pg 428, section 1.5 "helmets, eye wear, data gloves") sensors positioned on the evaluator in the initial posture using a computer system (Nayar: pg. 428, section 1.4, lines 7-8 with section 3); creating a virtual human digitally to represent the evaluator

(Nayar: pg. 428, section 2) using the digital motion capture sensor locations for the virtual human, the evaluator's measurements and the scale ratio (Nayar: pg. 428, section 1.4, lines 7-8 with section 3); aligning the virtual human (Purschke: abstract)with the evaluator, wherein the motion capture sensor locations (Nayar: pg 428, section 1.5 "helmets, eye wear, data gloves") on the virtual human (Purschke: abstract) are aligned with the motion capture sensor locations on the evaluator's measurements (Nayar: pg 428, section 1.5 "helmets, eye wear, data gloves"), and checking that the motion of the virtual human mirrors (Nayar: pg. 428, section 2, lines 2-5) the motion of the evaluator (Nayar: pg. 428, section 1.4, lines 7-8 with section 3; with Purschke: pg. 11, lines 26).

Claim 15. A method of subjective evaluation of a vehicle design (Purschke: title) within a virtual environment using virtual reality (Purschke: section 1, Introduction, 1st paragraph), said method comprising (Purschke: title) the steps of: preparing an adjustable property to represent the vehicle design (Purschke: title; Nayar: pg. 428, section 1.4, lines 7-8; and Purschke: pg. 9 figure 12, and section 3.1); measuring the evaluator (Nayar: pg. 428, section 3, left column, 2nd paragraph, lines 7-9); positioning a full-body motion capture system (Nayar: pg. 428, sections 1.5 and 2.0) on an evaluator for sensing a motion ("haptic feedback", Purschke: pg. 6, left column, 1st paragraph, lines 1-5) of the evaluator and communicating the sensed motion of the evaluator ("haptic feedback", Purschke: pg. 6, left column, 1st paragraph, lines 1-5) to a computer system, so that the motion of the evaluator (Nayar: pg. 428, section 2) controls the motion of the virtual human (Nayar: pg.428, section 3) in the virtual environment;

providing the evaluator (Nayar: pg. 428, section 2.0) with a virtual reality (Purschke: section 1, Introduction, 1st paragraph) display (Purschke: pg. 9, figure 12) mechanism operatively communicating with the computer system, (Nayar: pg. 428, section 2.0) for providing the evaluator a view of the virtual environment while evaluating the vehicle design Nayar: pg.428, section 3) determining a scale ratio (Nayar: pg. 428, section 1.4, lines 7-8) and range of a target population (Purschke: abstract, "automotive interior design for human beings") for the evaluator wherein the scale ratio is a ratio (Nayar: pg. 428, section 1.4, lines 7-8) between a predetermined dimension (Purschke: abstract, "automotive interior design for human beings") of the evaluator and a predetermined dimension (Purschke: abstract, "automotive interior design for human beings") of a member of a the target population (Nayar: pg. 428, section 1.4, and 3); adjusting the property using the scale ratio (Nayar: pg. 428, section 1.4, lines 7-8) for the evaluator (Nayar: pg. 428, section 1.4, lines 7-8); growing the virtual human (Purschke: Introduction, 1st paragraph) in the virtual environment using the measurements of the evaluator (Nayar: pg. 428, section 1.4, lines 7-8) and the scale ratio to virtual represent a scaled evaluator (Nayar: pg. 428, section 3); aligning the virtual human (Purschke: Introduction, 1st paragraph) in the virtual environment (Purschke: title) to the evaluator and the property; performing the evaluation of the vehicle design by the evaluator (Nayar: pg. 428, section 2.0); and using the evaluation of the vehicle design (Purschke: title; Nayar: pg. 428, section 1.4, lines 7-8; and Purschke: pg. 9 figure 12, and section 3.1) in the desire of the vehicle (Purschke: title; Nayar: pg. 428, section 1.4, lines 7-8; and Purschke: pg. 9 figure 12, and section 3.1).

Claim 16. A method as set forth in claim 15(Purschke: title; Nayar: pg. 428, section 1.4, lines 7-8; and Purschke: pg. 9 figure 12, and section 3.1), including the step of determining whether to perform a new evaluation (user's option) and performing a new evaluation if determined to perform a new evaluation (Nayar: pg. 428, section 3, right column, 1st paragraph).

Claim 17. A method as set forth in claim 16(Purschke: title; Nayar: pg. 428, section 1.4, lines 7-8; and Purschke: pg. 9 figure 12, and section 3.1) including the step of determining whether to use a new evaluator (user's option) and using a new evaluator (user's option) if determined to use a new evaluator (Nayar: pg. 428, section 3, right column, 1st paragraph).

Claim 18. A method as set forth in claim 17 (Purschke: title; Nayar: pg. 428, section 1.4, lines 7-8; and Purschke: pg. 9 figure 12, and section 3.1) including the step of determining whether to revise the scale ratio (Nayar: pg. 428, section 1.4, lines 7-8) if determined not to use a new evaluator (user's choice) and revising the scale ratio (Nayar: pg. 428, section 1.4, lines 7-8) if determined to revise the scale ratio (Nayar: pg. 428, section 3, right column, 1st paragraph).

Claim 19. A method as set forth in claim 15 (Purschke: title; Nayar: pg. 428, section 1.4, lines 7-8; and Purschke: pg. 9 figure 12, and section 3.1) wherein said step of

growing the virtual human (Purschke: Introduction, 1st paragraph) includes the steps of: assuming an initial posture by the evaluator (sitting position, well known); digitally establishing locations of motion capture sensors (Nayar: pg 428, section 1.5 "helmets, eye wear, data gloves") positioned on the evaluator in the initial posture using a computer system (Nayar: pg. 428, section 4, 3rd paragraph); creating a virtual human (Purschke: pg. 9 figure 12) digitally using the motion capture sensor locations (Nayar: pg 428, section 1.5 "helmets, eye wear, data gloves") for the virtual human (Purschke: Introduction, 1st paragraph) and the scaled measurements (Nayar: pg 428, section 1.5 "helmets, eye wear, data gloves") of the evaluator; aligning the virtual human (Purschke: Introduction, 1st paragraph) with the evaluator, wherein the motion capture sensor (Nayar: pg 428, section 1.5 "helmets, eye wear, data gloves") locations on the virtual human (Purschke: Introduction, 1st paragraph) are aligned with the motion capture sensor locations on the evaluator (Nayar: pg. 428, section 3 and 4 with Purschke: pg. 11, lines 25-26); and checking that the motion (viewed by the user) of the virtual human (Purschke: Introduction, 1st paragraph) mirrors the motion of the evaluator (Purschke: pg. 11, lines 25-26).

Claim 20. A method as set forth in claim 15(Purschke: title; Nayar: pg. 428, section 1.4, lines 7-8; and Purschke: pg. 9 figure 12, and section 3.1), determining a scale ratio (Nayar pg. 428, section 1.4, lines 7-8) range for a member of a target population (automotive consumers) represented in the evaluation and using the scale ratio (Nayar pg. 428, section 1.4, lines 7-8) range to determine adjustability of the property (Nayar:

pg 482, sections 1.4; and 3; specifically, section 3, right column, 2nd paragraph, last sentence).

(10) Response to Arguments

Claims 1 through 6

Appellant alleges that Nayar fails to teach or mention a scaleable physical property representative of vehicle design adjusted to a scale ratio for an evaluator of the vehicle design (pg.9, 2nd paragraph). The Office directs the discussion to Nayar, page 428, section 1.4, to which the documents state the user's ability to create desired geometry and that the geometry "can be scaled down" (Nayar: pg. 428, section 1.4, line 8). The Office, in view this limitation within the context of the subject matter, believes there's no distinction between a "scale ratio" and "scaling down" of a 3D human image for, in this instance, to gage various human body shapes for a specified cliental (target population), to which the Nayar reference teaches (Nayar: pg. 428, section 3, "The Human Motion Programming Interface"). Furthermore, the Office further refutes this argument by stating the scaling ratio encompasses the entire process of modifying human body characteristics (Nayar pg. 428, section 3, right column, 1st paragraph) for car interior design: *The system only remembers postures that are explicitly stored by the user. A posture contains information regarding the joint values, attachments, and analysis. There is no limit to the number of postures in a motion sequence or the number of sequences attached to a worker. The interface also provides utilities to move*

forward and backward through postures for quick visual verification and editing of motion sequences.

Appellant denotes the combination of references lack motivation (pg.10, 2nd paragraph, last sentence) to which the Office refutes by the following from Purschke: "furthermore the user in an VE is able to choose every point he/she desires" (pg. 9, section 3.2. lines 1-2) .

Claims 8 through 14

As set forth in the rejection above, Nayar discloses the scaleable ratio limitation (appellant's arguments pg.14, lines 9-11 and lines 20-23; pg. 15, lines 12-20; pg. 16, 2nd & 3rd paragraphs).

In response to appellant's arguments against the references individually (specifically the Nayar reference, appellant's arguments, pg. 14, lines 9-11), one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). In this instance, Nayar teaches an interactive 3D software simulation-based tool for human factors such as motions, posture (abstract), scaling down (pg. 428, section 1.4, lines 7-8) to accommodate any specific ergonomic design; but doesn't teach using this feature for automotive interior design. Purschke teaches a series of steps of car development using virtual humans for interior design. Nayar and Purschke are analogous since they each teach 3D human CAD simulation.

Claims 15-20

As set forth in the rejection above, Nayar discloses the scaleable ratio limitation (appellants arguments, pg. 18, 2nd paragraph; and pg.19, 2nd paragraph)

In response to appellant's arguments against the references individually (specifically the Nayar reference), one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Appellant denotes that the references fail to teach a method for subjective evaluation of a vehicle design within a virtual environment using virtual reality includes the steps of the scale ratio and range of the target population for an evaluator (pg. 19, 2nd paragraph; also on page 20, lines 5-18). The Office directs the rebuttal to Purschke's abstract (line 1), stating, *"this article describes the use of a virtual reality techniques during the car development process at Volkswagen"* and secondly, Nayar (page 428, section 1.4; and section 3, right column, last paragraph, respectively) stating the *"existing geometry can be scaled down...During inverse kinematics, the redundant shoulder rotation is adjusted based on experimental results from neurophysiologic studies to put the elbow in a "natural" setting"* (underline emphasized).

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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Examiner

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